

1/PrAs

430 Rec'd PTO

09/646626

20 SEP 2000

[10677/31]

OPERATOR BUTTONS AS ACTIVE BUTTONS

a

Field of the Invention

The present invention relates to a programmable controller having a processing unit, a display screen, an operator unit and signal inputs and signal outputs, where the processing unit, the display screen, the operator unit, the signal inputs and signal outputs are accommodated in a common housing, and where switching functions can be programmed by the user on the basis of predetermined functions by using a menu-assisted user interface on the display screen.

Related Technology

Such controllers are often used as intelligent switch elements in industry, in science and in households. With these controllers, switching sequences between the input voltages applied to the signal inputs and the signal outputs can be programmed in a variety of ways. Internal modules such as counter modules or timer modules and finished functions of an implemented operating system are made available to the user for his programs. The programs are entered either through the menu-assisted interface with the operator buttons present on the controller or they are entered by means of an external computer (PC) connected by a data line.

One disadvantage in creating the switching programs is that it is extremely difficult or impossible to test the running of these programs. For example, the required voltages must be applied to the signal inputs for testing in order to trigger the switching sequence and the signal output associated with it. Likewise, it is very difficult to conduct any troubleshooting while the program is running. These programs contribute toward a great uncertainty in operation. Another disadvantage of the known controllers is that once a switching program is running, it can be influenced only through complicated measures or not at all.

Therefore, ^{an object} ~~the object~~ of the present invention is to create a programmable controller that has a great operational reliability and is convenient to use and its switching programs can be tested easily for correct running without requiring any auxiliary means.

~~This object is achieved by a programmable controller according to the characterizing feature of Claim 1.~~

EL594607436US

INSA2

The active button according to the present invention can be used in a variety of ways. It is thus possible with a first especially advantageous embodiment to simulate a signal input by means of the active button. For activation of this button, a function is provided in the operating system so that each of the operator buttons can be declared an active button by means of this function. Operation of the active button defined in this way can then be treated as a logic state instead of an electric input signal within a switching program. Each switching sequence can thus be linked to operation of the active button. The active button functions like an additional input without a terminal.

Since each voltage state at one of the signal inputs can be equated, i.e., simulated, to operation of an active button, i.e., simulated, it is not necessary to have any other auxiliary means such as an independent power supply or sensor for testing a switching program or for troubleshooting. The controller can be programmed and tested at any time without the presence of input voltages. Thus, it can be set up before use at the subsequent site of use. It thus becomes especially simple and convenient to set up switching programs in the programmable controller.

The convenient option of replacing the input signals makes this programmable controller reliable and thus inexpensive for the user because of the low expenditures for repairs and maintenance.

The active buttons can be activated and deactivated in the system parameters of the controller. The initial state is "deactivated." If the buttons are active, they can be used during the program sequence and in the status menu.

In another advantageous embodiment, the active button is set so that when it is operated, a program being run is influenced. In this function as an interrupt, for example, the active button can be used in the manner of an emergency off in a program. To do so, the active button is set at an interrupt of the microcontroller present in the controller or its status is queried in cycles within the switching program. Just as in the first embodiment, the sequence of a switching function thus depends on operation of the active button.

Another possible application of the active button is to provide manual control, bypassing the program sequence, within a switching program. For example, it is possible to use the controller as an automatic timer for roller blinds and nevertheless make it possible for manual control to override the automatic timer by using the active

buttons.

The function for activating and deactivating a button is advantageously designed so that the active button can be used anywhere in the programmable switching function. Thus, a flexible use option and thus an especially great operating convenience are guaranteed. To simulate multiple signal inputs, it is advantageous to use a corresponding number of active buttons within a programmable switching function. The number of active buttons used at the same time is limited only to the number of operator buttons on the controller, each of which can be switched as an active button.

It is also advantageous to display the instruction to operate an active button on the display screen. This informs the user of the operating steps required. To notify the user that input is needed, ^{it may be} ~~it is~~ advantageous to combine the instruction to operate the active button with an acoustic signal.

Brief Description of the Drawings

~~An embodiment of the controller according to the present invention having active buttons is illustrated in Figures 1 and 2 and is explained in greater detail below; they show:~~

~~Figure 1 shows~~ ^{Figure 1 shows} a programmable ~~controller and~~ ^{controller; and}
~~Figure 2 shows~~ ^{Figure 2 shows} an example of using an active button.

Detailed Description

~~Figure 1~~ ^{Figure 1} The figure shows a programmable controller having a housing 1 and a row of voltage inputs 2 (I) and voltage outputs 3 (O). The programmed controller switches the current flow between inputs 2 and outputs 3 under the control of a program. The program can be entered into ^{a processing} ~~the processing~~ unit accommodated in housing 1 by means of operator buttons 4 and multifunction button 5. Each of operator buttons 4 and multifunction button 5 can be defined as an active button. Input and ^{a program} ~~the program~~ sequence can be observed on display screen 6. The requirement to operate an active button in a field 11 is displayed on display screen 6. Otherwise, a menu-assisted user interface is displayed on display screen 6 during programming. The controller can be programmed by an external computer (PC) by means of an interface 7.

Figure 2 shows an example of using an active button. Signal inputs 8 and 9 are wired so that a signal (I) must be applied to input 8 and there must be no signal applied to input 9 (I) in order to obtain an output signal at signal output 10. The

condition for applying the signal to output 10 is operation of operator button 12 (P1), which is also displayed in field 11 on display screen 6 (Figure 1). Appearance of the instruction to make an entry ^{Can be accompanied} ~~is accompanied~~ by an audible signal 13.